Democratic Republic of the Congo



Demographic and Health Survey (DRC-DHS II)

2013-2014

Supplemental Vaccine-preventable Diseases Report

DEMOCRATIC REPUBLIC OF THE CONGO

DEMOGRAPHIC AND HEALTH SURVEY (DRC-DHS II 2013-2014)

Supplemental vaccine-preventable diseases report: A serosurvey of population immunity to measles, rubella, and tetanus among children 6-59 months

August 2015

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The second Demographic and Health Survey in the Democratic Republic of Congo (DRC-DHS II) was conducted by the Ministry of Monitoring, Planning and Implementation of the Modern Revolution [Ministère du Plan et Suivi de la Mise en oeuvre de la Révolution de la Modernité], in collaboration with the Ministry of Public Health [Ministère de la Santé Publique]. The DRC-DHS II was financed by the government of DRC, the US government through the United States Agency for International Development (USAID) and the President's Emergency Plan For AIDS Relief (PEPFAR), the Department For International Development (DFID), the World Bank through the Health Sector Rehabilitation Support Project [Projet d'Appui à la Réhabilitation du Secteur de la Santé (PARSS)], the Global Fund through the ASBL Primary Health Care in Rural Areas [Soins de Santé Primaire en milieu Rural] (SANRU), the United Nations Children's Fund (UNICEF), the United Nations Population Fund (UNFPA) and the University of California Los Angeles (UCLA). Other institutions also provided assistance for the survey, notably the National AIDS and STI Control Program's Reference Laboratory [Laboratoire National de Référence (LNR) du Programme National de Lutte contre le VIH/Sida et les infections sexuellement transmissibles (PNLS)], The National Institute for Biomedical Research [Institut National de Recherche Biomédicale (INRB)], Family Health International (FHI 360), the Centers for Disease Control and Prevention (CDC) and the University of North Carolina (UNC) for certain biomarker tests. ICF International provided technical assistance to the entire project via the MEASURE DHS project, financed by USAID, which provides support and technical assistance for population and health surveys in countries worldwide. The Kinshasa WHO office also provided logistical support, notably in clearing medical supplies through customs.

Additional information about the DRC-DHS may be obtained from the Ministère du Plan et SMRM, 4155, Rue des Coteaux, Quartier Petit Pont, Kinshasa/Gombe, BP 9378 Kin 1, Kinshasa, E-mail: miniplan@gmail.com.

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Childhood vaccine-preventable diseases (VPDs) continue to pose major public health problems in terms of global morbidity and mortality. In the Democratic Republic of Congo (DRC), results from a recent national EPI Cluster Survey in May 2012 suggest that routine vaccination coverage varies widely by province. Independent monitoring and post-campaign evaluations confirm that there are still many children with zero or incomplete doses of routine vaccinations[1,2,3]. Currently available sources of vaccination coverage data, including administrative reports from the National Expanded Programme on Immunization (EPI), WHO/UNICEF coverage estimates, and national household surveys—including Demographic and Health Surveys (DHS), Multiple Indicator Cluster Surveys (MICS), and Immunization Cluster Surveys—have traditionally been based on vaccination records that are often unavailable and incomplete or maternal recall, which is known to be biased[4,5,6]. In the 2013 DHS, vaccination cards were seen in only 26% of cases. Furthermore, these estimates do not reflect population immunity, which can be affected by multiple factors.

Prolonged interruptions in vaccination activities due to conflict and unrest over the last decade may have resulted in significant immunity gaps in older children and adults, potentially leaving entire cohorts susceptible to vaccine-preventable diseases. Poor infrastructure and difficult terrain isolate many villages in DRC, making vaccine delivery, supply, and storage under proper conditions difficult. Therefore, vaccine efficacy may be compromised, resulting in sub-optimal immunity at both the individual and population levels.

DRC has seen a number of large-scale measles outbreaks throughout the last decade; measles continues to be one of the largest causes of vaccine-preventable disease mortality among children under five, despite the fact that a safe and efficacious vaccine is readily available[7,8]. Suspected measles cases counts were at a historic low in 2009, however in 2010, DRC saw a resurgence of measles cases with large-scale outbreaks affecting all 11 provinces[7,8]. These outbreaks are mainly attributed to gaps in routine immunization (RI) coverage, compounded with missed supplementary immunization activities (SIAs).

DRC's EPI includes one dose of measles vaccine at 9 to 11 months of age followed by the second dose provided through "catch-up" campaigns for children age 6 months to 14 years, and rolling "follow-up" campaigns targeting children 6 to 59 months every three years[7,9]. Routine immunization remains sub-optimal, with World Health Organization (WHO) and United Nations Children's Fund (UNICEF) national coverage estimates placed at 73%, which is well below the recommended 90%[8,10].

Population immunity to tetanus can be used as a proxy to determine the effectiveness of routine immunization due to the high fatality rate in cases (70%-90% fatal in neonatal tetanus) and the lack of natural immunity in those who recover[11,12]. Therefore, we would expect to see the presence of antibodies to tetanus at rates corresponding to reported vaccine coverage.

While rubella is currently not part of the routine immunization schedule in DRC, developing an understanding of the immunity profile of this disease will play an important role in policy for the addition of this antigen to the vaccination schedule.

Serosurveys measuring specific IgG antibodies are a direct and accurate method to assess population susceptibility and can provide critical insight into ongoing immunity gaps and operational program efficiency, although they are logistically challenging and expensive to undertake. As a result, they are generally limited to small geographic areas or convenience samples that may produce biased results and cannot be interpreted on a national scale.

We have therefore developed a first-of-its-kind collaboration with the DRC's Demographic and Health Survey (DHS) to obtain robust, nationally representative estimates of population immunity to measles, mumps, rubella, varicella, and tetanus.

The objectives of this study were to 1) assess age-specific population immunity to vaccine-preventable diseases (measles, mumps, rubella, varicella, and tetanus) among children age 6 to 59 months

and 2) to identify risk factors associated with susceptibility to measles, mumps, rubella, varicella, and tetanus in children. The study was not designed to distinguish between vaccination and natural infection, but rather to determine the presence of immunity gaps. Whether these gaps are due to failure to vaccinate or vaccination failure cannot be assessed here.

The second Demographic and Health Survey in the Democratic Republic of Congo (EDS-RDC II) was designed to provide data for monitoring the population and health situation in DRC[13]. The EDS-RDC II provides reliable data on fertility; sexual activity; fertility preferences; knowledge and use of family planning; breastfeeding; the nutritional status of women and children under age five; childhood mortality; adult mortality (including maternal mortality); maternal and child health; HIV/AIDS and STI knowledge; and the use of mosquito nets to prevent malaria. Additionally, the survey included testing for HIV, anemia, malaria, and vaccine-preventable-diseases immunity (measles, mumps, rubella, varicella, and tetanus).

The EDS-RDC II was a nationwide, household based, multi-stage cluster survey. Fieldwork was completed from November 2013 to February 2014, and 18,171 households were successfully interviewed. In all, 18,827 women age 15 to 49 years in all selected households and 8,656 men age 15 to 59 years in 50% of selected households completed interviews. Children were eligible for biomarker data collection (height, weight, anemia, malaria, and vaccine-preventable disease serology) if the household had been selected for a man's questionnaire and were age 6 to 59 months. Dried blood spots (DBS) were collected from participating children to assess population immunity to VPDs.

In total, 9,878 DBS were received and processed at the UCLA-DRC laboratory at the National Laboratory for Biomedical Research (INRB) in Kinshasa, DRC. Of these, 8,420 were from children age 6-59 months who were eligible for antibody testing. Laboratory testing was completed using the Dynex Technologies M²® multiplex Measles, Mumps, Rubella, Varicella, and Tetanus (MMRVT) immunoassay platform. Polystyrene beads coated separately with antigen to measles, mumps, rubella, varicella-zoster virus, and tetanus were immobilized within 54-well M² assay strips with 10 beads per well and processed using a modified Dynex DS2® automated ELISA system for IgG antibody detection. Assay cutoffs were set by reference to 3 singleplex and 1 multiplex FDA-approved ELISA kits, with a positive and negative control on each plate. Quantity control was performed in a 10% random subset of the samples at University of North Carolina, Chapel Hill on Luminex® xMAP® (multi-analyte profiling) technology platform.

SUMMARY OF RESULTS

- National measles seropositivity was 64.4%. The lowest seropositivity rates were seen in Kasai Occidental (53.6%), Maniema (52.0%), Kasai-Oriental (51.9%), and Katanga (51.4%) provinces.

- Overall tetanus seroprevalence was 36.0%. Provincial seropositivity estimates were lowest in Katanga (27.8%) and Maniema (20.1%). Large immunity gaps in both measles and tetanus are indicative of a weak routine immunization system.

- In the absence of a vaccine, rubella seropositivity was 34.4%. The high prevalence of circulating rubella virus in Bandundu (52.5%) and Bas-Congo (44.2%) suggest the need to evaluate immunization recommendations for rubella in DRC.

- National seroprevalence for both mumps and varicella is very low. For mumps, the overall seroprevalence is 22.0%, and is lowest in Équateur (13.2%) and Kasaï Oriental (18.3%). For varicella, the overall seroprevalence is just 9%, and is lowest in Équateur (3.9%) and Maniema (2.4%).

- Population immunity to VPDs varied widely by disease and province. Seropositivity rates were highest for measles suggestive of large-scale outbreaks that affect all 11 provinces.

- Seropositivity rates among the other VPDs were unexpectedly low, despite a 3-dose immunization schedule. This suggests the need for routine immunization system strengthening in DRC.

- There was also a lower-than-expected correlation between reported vaccination rates in the DHS and immunity to VPDs. Among those age 12-23 months who were reported to have been vaccinated against measles (either by a vaccination card or by the mother's declaration), only 62.1% tested positive for the presence of measles antibodies. Among those 12-23 months who were reported to have had three doses of the pentavalent vaccine, only 57.5% tested positive for the presence of tetanus antibodies.

Table 1 Children 6 to 59 months (de facto) eligible for MMRVT antibody testing according to demographic characteristics (unweighted), Democratic Republic of Congo, 2013-2014

Sociodemographic characteristic	% of children tested[1]	Number of eligible children (6-59 months)[1]
Sex		
Male	95.3	4,183
Female	95.4	4,237
Age (in months)		
6-8	86.0	480
9-11	95.5	441
12-17	96.7	1,051
18-23	95.7	795
24-35	96.0	1,872
36-47	96.2	1,911
48-59	95.2	1,870
Area of residence		
Urban	94.6	2,462
Rural	95.7	5,958
Province		
Kinshasa	92.3	442
Bas-Congo	96.1	382
Bandundu	94.1	1,124
Équateur	98.0	1,324
Orientale	94.6	986
Nord-Kivu	97.3	482
Sud-Kivu	96.5	482
Maniema	95.1	409
Katanga	95.7	1,052
Kasaï Oriental	92.7	1,003
Kasaï Occidental	96.2	734
Total	**95.4**	**8,420**

[1] Children with an available test result and identified in the questionnaire

Table 2 Results estimating the presence of measles antibodies

Distribution of children 6-59 months tested for the presence of measles antibodies, by demographics and test results, Democratic Republic of Congo, 2013-2014

	Test results			
Sociodemographic characteristic	Positive	Negative	Indeterminate	Children age 6-59 months with a test result
Sex				
Male	62.9	34.4	2.8	4,074
Female	66.0	31.9	2.1	4,043
Age category (in months)				
6-8	18.3	81.1	0.6	414
9-11	40.9	57.2	1.9	463
12-23	54.3	42.9	2.8	1,767
12-17	*51.0*	*46.7*	*2.3*	*998*
18-23	*58.6*	*37.9*	*3.5*	*769*
24-35	66.5	32.1	1.3	1,851
36-47	74.8	22.0	3.2	1,792
48-59	78.4	18.5	3.0	1,830
Place of residence				
Urban	65.3	32.9	1.9	2,417
Rural	64.1	33.2	2.7	5,700
Province				
Kinshasa	75.8	22.5	1.7	535
Bas-Congo	59.3	37.2	3.4	338
Bandundu	59.8	39.0	1.2	1,336
Équateur	72.8	24.8	2.4	1,253
Orientale	76.0	21.2	2.7	806
Nord-Kivu	81.6	16.2	2.2	653
Sud-Kivu	69.4	26.5	4.0	593
Maniema	52.0	43.3	4.7	283
Katanga	51.4	46.5	2.1	835
Kasaï Oriental	51.9	45.9	2.2	875
Kasaï Occidental	53.6	43.1	3.4	609
Total	**64.4**	**33.1**	**2.4**	**8,116**

Table 3 Results estimating the presence of tetanus antibodies

Distribution of children 6-59 months tested for the presence of tetanus antibodies, by demographics and test results, Democratic Republic of Congo, 2013-2014

Sociodemographic characteristic	Test Results			Children age 6-59 months with a test result
	Positive	Negative	Indeterminate	
Sex				
Male	35.1	63.2	1.7	4,074
Female	36.8	62.0	1.2	4,043
Age category (in months)				
6-8	46.7	52.3	1.0	414
9-11	43.6	56.0	0.4	463
12-23	44.3	54.2	1.5	1,767
12-17	*43.0*	*55.0*	*2.0*	*998*
18-23	*46.1*	*53.2*	*0.8*	*769*
24-35	36.8	62.0	1.2	1,851
36-47	29.3	69.7	1.0	1,792
48-59	29.1	68.4	2.5	1,830
Place of residence				
Urban	42.7	55.0	2.2	2,417
Rural	33.1	65.8	1.1	5,700
Province				
Kinshasa	51.3	46.6	2.1	535
Bas-Congo	41.6	57.2	1.2	338
Bandundu	32.3	67.0	0.6	1,336
Équateur	30.3	68.2	1.5	1,253
Orientale	33.5	65.5	1.0	806
Nord-Kivu	51.8	46.4	1.8	653
Sud-Kivu	43.5	55.6	0.9	593
Maniema	20.1	79.4	0.6	283
Katanga	27.8	69.8	2.3	835
Kasaï Oriental	34.5	64.0	1.5	875
Kasaï Occidental	38.6	58.8	2.6	609
Total	**36.0**	**62.6**	**1.4**	**8,116**

Table 4 Results estimating the presence of rubella antibodies

Distribution of children 6-59 months tested for the presence of rubella antibodies, by demographics and test results, Democratic Republic of Congo, 2013-2014

Sociodemographic characteristic	Test Results			Children age 6-59 months with a test result
	Positive	Negative	Indeterminate	
Sex				
Male	34.0	65.8	0.2	4,074
Female	34.8	65.1	0.1	4,043
Age category (in months)				
6-8	14.0	85.2	0.8	414
9-11	23.9	76.1	0.0	463
12-23	26.6	73.3	0.1	1,767
12-17	*25.9*	*74.0*	*0.0*	*998*
18-23	*27.4*	*72.5*	*0.1*	*769*
24-35	32.7	67.1	0.2	1,851
36-47	37.7	62.2	0.1	1,792
48-59	47.6	52.3	0.1	1,830
Place of residence				
Urban	37.3	62.5	0.1	2,417
Rural	33.1	66.7	0.2	5,700
Province				
Kinshasa	40.4	59.3	0.3	535
Bas-Congo	44.2	55.8	0.0	338
Bandundu	52.5	47.2	0.3	1,336
Équateur	30.7	69.1	0.2	1,253
Orientale	31.1	68.8	0.1	806
Nord-Kivu	31.2	68.5	0.3	653
Sud-Kivu	28.1	71.9	0.0	593
Maniema	28.7	71.3	0.0	283
Katanga	35.2	64.5	0.3	835
Kasaï Oriental	19.3	80.6	0.0	875
Kasaï Occidental	28.5	71.5	0.0	609
Total	**34.4**	**65.5**	**0.2**	**8,116**

Table 5 Results estimating the presence of mumps antibodies

Distribution of children 6-59 months tested for the presence of mumps antibodies, by demographics and test results, Democratic Republic of Congo, 2013-2014

Sociodemographic characteristic	Test results			Children age 6-59 months with a test result
	Positive	Negative	Indeterminate	
Sex				
Male	21.6	75.7	2.8	4,074
Female	22.4	74.0	3.6	4,043
Age category (in months)				
6-8	6.6	91.3	2.1	414
9-11	9.8	89.2	1.0	463
12-23	15.0	82.6	2.5	1,767
12-17	*12.8*	*84.6*	*2.5*	*998*
18-23	*17.8*	*79.9*	*2.3*	*769*
24-35	21.0	76.5	2.5	1,851
36-47	26.4	69.7	3.9	1,792
48-59	32.0	63.3	4.8	1,830
Place of residence				
Urban	24.0	72.7	3.3	2,417
Rural	21.1	75.7	3.1	5,700
Province				
Kinshasa	31.8	64.2	4.0	535
Bas-Congo	20.8	76.3	2.9	338
Bandundu	21.6	75.9	2.5	1,336
Équateur	13.2	83.5	3.3	1,253
Orientale	25.3	71.1	3.6	806
Nord-Kivu	27.2	70.1	2.7	653
Sud-Kivu	28.9	68.9	2.1	593
Maniema	23.3	70.3	6.5	283
Katanga	20.9	75.1	4.0	835
Kasaï Oriental	18.3	78.8	2.9	875
Kasaï Occidental	22.2	75.0	2.8	609
Total	**22.0**	**74.8**	**3.2**	**8,116**

Table 6 Results estimating the presence of varicella antibodies

Distribution of children 6-59 months tested for the presence of varicella antibodies, by demographics and test results, Democratic Republic of Congo, 2013-2014

Sociodemographic characteristic	Test results			Children age 6-59 months with a test result
	Positive	Negative	Indeterminate	
Sex				
Male	8.4	88.9	2.6	4,074
Female	9.6	88.8	1.6	4,043
Age category (in months)				
6-8	3.5	95.8	0.7	414
9-11	4.3	92.3	3.4	463
12-23	6.0	93.5	0.6	1,767
12-17	*5.2*	*94.3*	*0.5*	*998*
18-23	*6.9*	*92.4*	*0.7*	*769*
24-35	9.1	88.9	2.1	1,851
36-47	9.9	87.5	2.6	1,792
48-59	13.5	83.2	3.3	1,830
Place of residence				
Urban	12.2	85.5	2.2	2,417
Rural	7.7	90.2	2.1	5,700
Province				
Kinshasa	12.0	85.9	2.1	535
Bas-Congo	14.0	85.2	0.8	338
Bandundu	11.7	86.7	1.6	1,336
Équateur	3.9	95.2	0.9	1,253
Orientale	6.4	91.0	2.6	806
Nord-Kivu	14.3	83.2	2.5	653
Sud-Kivu	17.2	76.9	5.9	593
Maniema	2.4	95.7	2.0	283
Katanga	10.8	86.5	2.6	835
Kasaï Oriental	4.6	93.2	2.2	875
Kasaï Occidental	5.1	93.6	1.3	609
Total	**9.0**	**88.8**	**2.1**	**8,116**

Table 7 Results of the test for the presence of measles antibodies and vaccination coverage among children 6-59 months

Distribution of children 6-59 months by the results of test for the presence of measles antibodies, by whether their vaccination card was seen during the survey or not, and by vaccination status, according to information collected in the survey, Democratic Republic of the Congo 2013-14

Vaccination card and vaccination coverage	Test results (measles)			Children age 6-59 months with a test result
	Positive	Negative	Indeterminate	
GIRLS 6-59 MONTHS				
Has vaccination card, seen during survey	63.9	33.9	2.2	710
Has vaccination card, not seen during survey	67.3	30.7	2.0	1,295
Does not have vaccination card	62.3	35.1	2.6	1,595
Vaccinated against measles (vaccination card)	73.6	23.8	2.6	547
Vaccinated against measles (mother's declaration)	73.3	24.0	2.6	2,002
Vaccinated against measles (either source)	73.4	24.0	2.6	2,549
Not vaccinated against measles	42.9	55.6	1.5	1,069
Information not collected	73.7	25.7	0.6	412
Total	**65.3**	**32.5**	**2.1**	**4,029**
BOYS 6-59 MONTHS				
Has vaccination card, seen during survey	64.6	32.7	2.8	667
Has vaccination card, not seen during survey	64.1	32.9	2.9	1,408
Does not have vaccination card	60.5	37.2	2.4	1,602
Vaccinated against measles (vaccination card)	76.4	20.2	3.3	518
Vaccinated against measles (mother's declaration)	68.5	28.3	3.1	2,049
Vaccinated against measles (either source)	70.1	26.7	3.2	2,567
Not vaccinated against measles	45.3	53.2	1.4	1,120
Information not collected	72.7	23.7	3.7	400
Total	**63.6**	**33.7**	**2.7**	**4,087**
TOTAL (BOYS AND GIRLS 6-59 MONTHS)				
Has vaccination card, seen during survey	64.2	33.3	2.5	1,378
Has vaccination card, not seen during survey	65.7	31.9	2.5	2,703
Does not have vaccination card	61.4	36.1	2.5	3,197
Vaccinated against measles (vaccination card)	75.0	22.1	2.9	1,065
Vaccinated against measles (mother's declaration)	70.9	26.2	2.9	4,051
Vaccinated against measles (either source)	71.7	25.4	2.9	5,116
Not vaccinated against measles	44.1	54.4	1.5	2,189
Information not collected	73.2	24.7	2.1	812
Total	**64.4**	**33.1**	**2.4**	**8,116**

Table 8 Results of the test for the presence of measles antibodies and vaccination coverage among children 12-23 months

Distribution of children 12-23 months by the results of test for the presence of measles antibodies, by whether their vaccination card was seen during the survey or not, and by vaccination status, according to information collected in the survey, Democratic Republic of the Congo 2013-14

Vaccination card and vaccination coverage	Test results (measles)			Children age 12-23 months with a test result
	Positive	Negative	Indeterminate	
GIRLS 12-23 MONTHS				
Has vaccination card, seen during survey	68.1	28.3	3.6	217
Has vaccination card, not seen during survey	52.7	46.6	0.7	271
Does not have vaccination card	52.5	46.2	1.3	344
Vaccinated against measles (vaccination card)	71.9	24.0	4.1	189
Vaccinated against measles (mother's declaration)	60.8	38.3	0.9	394
Vaccinated against measles (either source)	64.4	33.6	2.0	583
Not vaccinated against measles	38.4	60.6	1.0	249
Information not collected	(76.4)	(23.6)	(0.0)	42
Total	**57.6**	**40.8**	**1.6**	**874**
BOYS 12-23 MONTHS				
Has vaccination card, seen during survey	58.6	37.8	3.6	211
Has vaccination card, not seen during survey	56.0	39.7	4.2	312
Does not have vaccination card	42.6	54.9	2.5	343
Vaccinated against measles (vaccination card)	66.2	29.4	4.4	173
Vaccinated against measles (mother's declaration)	56.9	38.8	4.3	399
Vaccinated against measles (either source)	59.7	36.0	4.3	572
Not vaccinated against measles	35.0	63.4	1.7	294
Information not collected	(44.2)	(33.4)	(22.3)	26
Total	**51.1**	**44.9**	**4.0**	**893**
TOTAL (BOYS AND GIRLS 12-23 MONTHS)				
Has vaccination card, seen during survey	63.4	33.0	3.6	428
Has vaccination card, not seen during survey	54.5	42.9	2.6	583
Does not have vaccination card	47.6	50.5	1.9	687
Vaccinated against measles (vaccination card)	69.2	26.6	4.3	362
Vaccinated against measles (mother's declaration)	58.8	38.5	2.6	793
Vaccinated against measles (either source)	62.1	34.8	3.1	1,155
Not vaccinated against measles	36.6	62.1	1.4	543
Information not collected	64.0	27.4	8.7	68
Total	**54.3**	**42.9**	**2.8**	**1,767**

Note: Figures in parentheses are based on 25-49 unweighted cases.

Table 9 Results of the test for the presence of tetanus antibodies and vaccination coverage among children 6-59 months

Distribution of children 6-59 months by the results of test for the presence of tetanus_antibodies, by whether their vaccination card was seen during the survey or not, and by vaccination status, according to information collected in the survey, Democratic Republic of the Congo 2013-14

Vaccination card and vaccination coverage	Test results (tetanus)			Children age 6-59 months with a test result
	Positive	Negative	Indeterminate	
GIRLS 6-59 MONTHS				
Has vaccination card, seen during survey	55.7	42.3	1.9	710
Has vaccination card, not seen during survey	39.8	58.6	1.6	1,295
Does not have vaccination card	28.5	71.0	0.6	1,595
Vaccinated against tetanus—first dose (vaccination card)	56.0	42.1	2.0	698
Vaccinated against tetanus—first dose (mother's declaration)	39.4	59.5	1.1	2,188
Vaccinated against tetanus—first dose (either source)	43.4	55.3	1.3	2,887
Not vaccinated against tetanus	15.8	83.3	0.8	731
Vaccinated against tetanus—second dose (vaccination card)	56.7	41.2	2.0	669
Vaccinated against tetanus—second dose (mother's declaration)	40.0	58.9	1.1	1,958
Vaccinated against tetanus—second dose (either source)	44.2	54.4	1.4	2,626
Not vaccinated against tetanus or second dose not received	20.9	78.3	0.8	991
Vaccinated against tetanus—third dose (vaccination card)	57.4	40.5	2.1	645
Vaccinated against tetanus—third dose (mother's declaration)	40.4	58.5	1.1	1,541
Vaccinated against tetanus—third dose (either source)	45.4	53.2	1.4	2,186
Not vaccinated against tetanus or third dose not received	26.2	72.8	1.0	1,432
Information not collected	27.6	71.3	1.1	412
Total	**36.8**	**62.0**	**1.2**	**4,029**
BOYS 6-59 MONTHS				
Has vaccination card, seen during survey	55.5	41.5	3.0	667
Has vaccination card, not seen during survey	35.9	62.9	1.2	1,408
Does not have vaccination card	26.4	72.1	1.5	1,602
Vaccinated against tetanus—first dose (vaccination card)	56.8	40.2	3.1	649
Vaccinated against tetanus—first dose (mother's declaration)	35.8	62.7	1.5	2,265
Vaccinated against tetanus—first dose (either source)	40.5	57.7	1.9	2,914
Not vaccinated against tetanus	15.4	83.6	1.0	773
Vaccinated against tetanus—second dose (vaccination card)	58.3	38.5	3.2	622
Vaccinated against tetanus—second dose (mother's declaration)	36.7	61.6	1.7	2,035
Vaccinated against tetanus—second dose (either source)	41.8	56.2	2.0	2,657
Not vaccinated against tetanus or second dose not received	18.2	81.0	0.8	1,030
Vaccinated against tetanus—third dose (vaccination card)	59.1	37.6	3.3	601
Vaccinated against tetanus—third dose (mother's declaration)	38.1	59.9	2.0	1,587
Vaccinated against tetanus—third dose (either source)	43.8	53.8	2.4	2,188
Not vaccinated against tetanus or third dose not received	22.6	76.7	0.6	1,499
Information not collected	34.7	63.7	1.6	400
Total	**35.2**	**63.2**	**1.7**	**4,087**
TOTAL (BOYS AND GIRLS 6-59 MONTHS)				
Has vaccination card, seen during survey	55.6	41.9	2.5	1,378
Has vaccination card, not seen during survey	37.8	60.8	1.4	2,703
Does not have vaccination card	27.4	71.5	1.1	3,197
Vaccinated against tetanus—first dose (vaccination card)	56.3	41.1	2.5	1,347
Vaccinated against tetanus—first dose (mother's declaration)	37.6	61.1	1.3	4,454
Vaccinated against tetanus—first dose (either source)	41.9	56.5	1.6	5,801
Not vaccinated against tetanus	15.6	83.5	0.9	1,504
Vaccinated against tetanus—second dose (vaccination card)	57.5	39.9	2.6	1,291
Vaccinated against tetanus—second dose (mother's declaration)	38.3	60.3	1.4	3,993
Vaccinated against tetanus—second dose (either source)	43.0	55.3	1.7	5,284
Not vaccinated against tetanus or second dose not received	19.5	79.7	0.8	2,021
Vaccinated against tetanus—third dose (vaccination card)	58.2	39.1	2.7	1,246
Vaccinated against tetanus—third dose (mother's declaration)	39.2	59.2	1.6	3,128
Vaccinated against tetanus—third dose (either source)	44.6	53.5	1.9	4,374
Not vaccinated against tetanus or third dose not received	24.4	74.8	0.8	2,931
Information not collected	31.1	67.6	1.3	812
Total	**36.0**	**62.6**	**1.4**	**8,116**

Table 10 Results of the test for the presence of tetanus antibodies and vaccination coverage among children 12-23 months

Distribution of children 12-23 months by the results of test for the presence of tetanus antibodies, by whether their vaccination card was seen during the survey or not, and by vaccination status, according to information collected in the survey, Democratic Republic of the Congo 2013-14

Vaccination card and vaccination coverage	Test results (tetanus)			Children age 12-23 months with a test result
	Positive	Negative	Indeterminate	
GIRLS 12-23 MONTHS				
Has vaccination card, seen during survey	68.9	27.8	3.3	217
Has vaccination card, not seen during survey	50.0	50.0	0.0	271
Does not have vaccination card	36.3	62.8	0.9	344
Vaccinated against tetanus—first dose (vaccination card)	69.4	27.2	3.3	215
Vaccinated against tetanus—first dose (mother's declaration)	50.7	48.8	0.5	439
Vaccinated against tetanus—first dose (either source)	56.9	41.7	1.4	654
Not vaccinated against tetanus	21.5	78.0	0.5	178
Vaccinated against tetanus—second dose (vaccination card)	69.9	26.7	3.4	208
Vaccinated against tetanus—second dose (mother's declaration)	50.4	49.3	0.3	390
Vaccinated against tetanus—second dose (either source)	57.2	41.5	1.4	598
Not vaccinated against tetanus or second dose not received	29.1	70.0	0.9	234
Vaccinated against tetanus—third dose (vaccination card)	71.0	25.5	3.6	200
Vaccinated against tetanus—third dose (mother's declaration)	51.4	48.3	0.3	289
Vaccinated against tetanus—third dose (either source)	59.4	39.0	1.6	489
Not vaccinated against tetanus or third dose not received	34.9	64.4	0.7	343
Information not collected	(19.6)	(80.4)	(0.0)	42
Total	**47.9**	**51.0**	**1.2**	**874**
BOYS 12-23 MONTHS				
Has vaccination card, seen during survey	65.0	31.7	3.3	211
Has vaccination card, not seen during survey	39.9	58.9	1.2	312
Does not have vaccination card	28.4	70.1	1.5	343
Vaccinated against tetanus—first dose (vaccination card)	67.6	29.1	3.4	203
Vaccinated against tetanus—first dose (mother's declaration)	41.8	57.2	0.9	467
Vaccinated against tetanus—first dose (either source)	49.6	48.7	1.7	670
Not vaccinated against tetanus	13.7	84.1	2.2	197
Vaccinated against tetanus—second dose (vaccination card)	69.0	27.5	3.5	198
Vaccinated against tetanus—second dose (mother's declaration)	44.4	54.5	1.1	396
Vaccinated against tetanus—second dose (either source)	52.6	45.5	1.9	593
Not vaccinated against tetanus or second dose not received	17.4	81.0	1.6	273
Vaccinated against tetanus—third dose (vaccination card)	70.3	26.0	3.6	189
Vaccinated against tetanus—third dose (mother's declaration)	45.7	52.9	1.4	287
Vaccinated against tetanus—third dose (either source)	55.5	42.3	2.3	477
Not vaccinated against tetanus or third dose not received	24.4	74.4	1.2	390
Information not collected	(19.5)	(80.5)	(0.0)	26
Total	**40.8**	**57.4**	**1.7**	**893**
TOTAL (BOYS AND GIRLS 12-23 MONTHS)				
Has vaccination card, seen during survey	67.0	29.7	3.3	428
Has vaccination card, not seen during survey	44.6	54.8	0.6	583
Does not have vaccination card	32.4	66.5	1.2	687
Vaccinated against tetanus—first dose (vaccination card)	68.5	28.1	3.4	418
Vaccinated against tetanus—first dose (mother's declaration)	46.1	53.1	0.7	906
Vaccinated against tetanus—first dose (either source)	53.2	45.2	1.6	1,324
Not vaccinated against tetanus	17.4	81.2	1.4	375
Vaccinated against tetanus—second dose (vaccination card)	69.4	27.1	3.5	406
Vaccinated against tetanus—second dose (mother's declaration)	47.4	51.9	0.7	786
Vaccinated against tetanus—second dose (either source)	54.9	43.5	1.6	1,192
Not vaccinated against tetanus or second dose not received	22.8	75.9	1.3	507
Vaccinated against tetanus—third dose (vaccination card)	70.7	25.7	3.6	389
Vaccinated against tetanus—third dose (mother's declaration)	48.6	50.6	0.8	576
Vaccinated against tetanus—third dose (either source)	57.5	40.6	1.9	966
Not vaccinated against tetanus or third dose not received	29.3	69.7	1.0	733
Information not collected	19.5	80.5	0.0	68
Total	**44.3**	**54.2**	**1.5**	**1,767**

Note: Figures in parentheses are based on 25-49 unweighted cases.

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